

New species and new combinations in *Rhysolepis* (Heliantheae: Asteraceae)

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Abstract.—A narrow circumscription of the genus *Viguiera* Kunth results in transfer of 58 species of Helianthinae with glabrous stamen filaments, exapendiculate style appendages, and a persistent pappus into *Rhysolepis* S.F.Blake. *Rhysolepis dillonorum* from Peru, *R. emaciata* from Bolivia, and *R. goyasensis*, *R. hatschbachii*, *R. laxicymosa*, *R. santacatarinensis*, and *R. subtruncata* from Brazil are new species. *Viguiera pazensis* and *V. procumbens* are placed in synonymy under *Rhysolepis helianthoides*, and *V. misionensis* is combined with *R. pilosa*.

The present study began with a project by the junior author to clarify the limits of two Andean species of *Viguiera* Kunth in H.B.K. and join in the description of a species from Brazil known to be undescribed. The project was undertaken with the knowledge that none of the species involved were truly congeneric with the type species of *Viguiera*, *V. helianthoides* Kunth in H.B.K. = *V. dentata* (Cav.) Spreng. The arrival of additional material from Gert Hatschbach of the Museo Botánico Municipal de Curitiba, led to review of other species problems and discovery of additional species needing description. In view of the number of species involved and because of the generic redelimitations of Schilling and Panero (2002), the decision has been made to abandon the long misapplied name *Viguiera* and use a more phylogenetically appropriate generic concept for the species in this study.

Viguiera traditionally has contained species related to *Helianthus* L., but differing by a more persistent pappus with squamellae. The most recent treatment of *Viguiera* in the broad sense was that of Blake (1918). Blake's treatment excluded some genera such as *Tithonia* Desf. with broadened, fistulose peduncles (La Duke 1982); *Syncre-*

tocarpus S. F. Blake (1916) with a glabrous strip just inside the lateral margins of its achenes that was misinterpreted as a wing; and *Rhysolepis* S. F. Blake (1917) with transverse corrugations on its paleae. The broad Blake concept of *Viguiera* included some elements now placed in *Hymenostephium* Benth. in Benth. & Hook.f., but excluded others (Schilling and Panero 2002). Some single species once placed in *Viguiera* have been moved to other genera, in example a Peruvian species named by Blake in 1918, *Viguiera acutifolia*, has been transferred to *Pappobolus* (Panero 1992) and a Mexican species included in *Viguiera* by Blake (1924) was subsequently transferred to *Stuessya* (Turner & Davies 1980).

In a brief review of members of the *Hymenostephium* group, Robinson (1977) retained the broad concept of *Viguiera* in spite of the realization that the type species of *Viguiera* was individually distinctive with pubescent anther filaments and a small apical appendage on the branches of the style. *Hymenostephium* was retained in *Viguiera* because it had an apical appendage on the style branches and was technically closer to the type of *Viguiera* than most other species placed in the latter genus. The

needed generic revisions of the concept of *Viguiera* were fully initiated by Schilling and Panero (2002); but the South American species and their relatives in Mexico with exappendiculate styles have not yet been treated.

The South American species are in need of transfer to some genus other than *Viguiera*. The problem has been that none of the synonyms given by Blake (1918) seems to be applicable. *Leighia* Cass. belongs to the group, but that name is a later homonym of *Leighia* Scop. As noted by Blake, the type of *Harpalium* Cass., *H. rigidum* (Desf.) Cass. (= *Helianthus rigidus* Desf.), is not a *Viguiera*. Other Blake synonyms, *Heliomeris* Nutt. and *Bahiopsis* Kellogg, are considered separate genera (Schilling & Panero 2002). The type of *Gymnolomia* Kunth in H.B.K., after some confusion, proved to belong to *Eleutheranthera* Poit. ex Bosc. (Robinson 1992). Thus, none of the synonyms from Blake (1918) can be used. A name is found, however, outside the synonymy of *Viguiera* as circumscribed by Blake in 1918. His genus *Rhysolepis*, in spite of its sometimes weakly transversely corrugated paleae, is not distinct from the group treated here, and so the name can be applied.

Rhysolepis S. F. Blake, Contr. Gray Herb. 52: 36 (1917).—Type: *Viguiera palmeri* A. Gray
Leighia Cass. in F. Cuvier, Dict. Sci. Nat. ed. 2. 25: 435 (1822).—Type: *Helianthus linearis* Cav. Not *Leighia* Scop. (1777). = *Ethulia* L.f.

Annual to perennial herbs or shrubs; often with tubers or with fusiform nodes on roots. Stems and leaves usually strigose, pilose, or hispid. Leaves alternate or opposite, sessile or petiolate, filiform to ovate, lanceolate, oblong, or broadly rounded; blade often trinervate with secondary veins near and subparallel to lower margin; margins entire to serrate. Inflorescences usually with 1–6 heads, sometimes heads over 50; peduncles usually elongate, 3–30 cm long, of-

ten stout, not enlarged and fistulose distally; involucre broadly campanulate; bracts in 2–5 series, gradate to subequal, oblong to ovate or lanceolate, at base usually with indurated ribs, at tips herbaceous, appressed or reflexed, rounded to acute; receptacle convex to conical; pales persistent, partially enclosing achenes, mostly ribbed and indurate, sometimes transversely corrugated, usually with blunt apex. Ray florets usually 8–24, sterile, sometimes lacking; corollas yellow, with yellow or orange resin ducts along veins. Disk florets usually 40–200, tightly packed, bisexual; corollas yellow or greenish-yellow, 5-lobed, with basal tube usually 0.5–1.0 mm long and narrow, usually scabrid on abruptly broadened base of throat and on backs of lobes, with yellow or orange resin ducts along 5 veins of throat; anther filaments without hairs or papillae; thecae blackish, shortly hastate at base; endothelial cells with nodes on transverse walls; apical appendage usually yellow, blackish in some annual species, ovate, concave abaxially often with cluster of glands in concavity; style with resin ducts outside of veins not restricted to branches; style branches spreading radially, with tuft of hairs or papillae at tip, without apical appendage, with stigmatic papillae covering whole inner surface. Achenes compressed, with or without setulae, without differentiated intramarginal bare strip; walls with phytomelanin interrupted by striations of pale cells; pappus mostly persistent, with pair of awns usually longer than squamellae on margins between awns, but awns sometimes not longer than squamellae. Chromosome numbers $n = 17, 34$.

Rhysolepis was described from Mexico and has previously been credited with only three Mexican species as recognized by Robinson (1972):

Rhysolepis kingii H. Rob., Phytologia 24: 210 (1972).

Rhysolepis morelensis (Greenm.) S. F. Blake, Contr. Gray Herb. 52: 36 (1917).

Viguiera morelensis Greenm., Proc. Amer. Acad. 40: 40 (1904).

Rhyssolepis palmeri (A. Gray) S. F. Blake, Contr. Gray Herb. n.s. 52: 37 (1917).

Viguiera palmeri A. Gray in S. Watson, Proc. Amer. Acad. 22: 427 (1887).

The broadened concept of *Rhyssolepis* recognized here includes the rather overlapping Blake (1918) sections and series, *Tenuifoliae* consisting of perennial herbs with linear leaves, solitary heads and involucre bracts 2-seriate and subequal; *Revolutae* with perennial herbs or subshrubs of the Chilean and Argentine Andes with large solitary heads and involucre bracts 2–5-seriate, gradate and lanceolate; *Grandiflorae* with perennial herbs having one or few large, long-pedunculate heads and having few leaves with the lowest opposite and scale-like; *Aureae*, primarily Andean, including annuals to shrubby perennials with broad leaves and involucre bracts mostly 3–5-seriate, usually gradate, lanceolate, and with herbaceous tips not strongly differentiated; *Bracteatae*, mostly of Brazil and Paraguay, including herbaceous perennials similar to the *Aureae* but with involucre bract tips shortly and abruptly herbaceous and blunt; *Leighia*, mostly Mexican, but similar to the *Aureae* and *Bracteatae* with involucre bracts strongly gradate, oblong and usually with an abrupt herbaceous tip; *Trichophylla* consisting of slender virgate perennials with linear to filiform leaves, revolute leaf margins and involucre bracts lanceolate to linear-lanceolate; and subgenus *Verbalesia* containing perennial herbs with pappus awns equalled in length by and partially fused to the squamellae. The following new combinations agree, to a considerable extent, with species concepts of Blake (1918), although that work left questions about the real distinctions of many species. As a result, more recent synonymies are taken into account, and other synonymies are to be expected. Many poorly known species are omitted.

Rhyssolepis anchusifolia (DC.) H. Rob. & A. J. Moore, comb. nov.

Leighia anchusaefolia DC., Prodr. 5: 580 (1836).

L. dissitifolia DC., Prodr. 5: 581 (1836).

L. immarginata DC., Prodr. 5: 581 (1836).

L. lomatoneura DC., Prodr. 5: 581 (1836).

L. stenophylla Hook. & Arn., J. Bot. 3: 313 (1841).

L. baldwiniana Nutt., Trans. Amer. Philos. Soc. ser. 2, 7: 365 (1841).

Viguiera stenophylla (Hook. & Arn.) Griseb., Goett. Abh. 24: 193 (1879).

V. anchusaefolia (DC.) Baker in Mart., Fl. bras. 6(3): 222 (1884). Argentina, Brazil, Uruguay.

Rhyssolepis arenaria (Baker) H. Rob. & A. J. Moore, comb. nov.

Viguiera arenaria Baker in Mart., Fl. bras. 6(3): 228 (1884). Brazil, north central São Paulo.

Rhyssolepis aspilioides (Baker) H. Rob. & A. J. Moore, comb. nov.

Viguiera aspilioides Baker in Mart., Fl. bras. 6(3): 228 (1884). Brazil, Matto Grosso.

Rhyssolepis atacamensis (Phil.) H. Rob. & A. J. Moore, comb. nov.

Viguiera atacamensis Phil., Anales Mus. Nac. Chile, Segunda Secc., Bot. 1891: 48 (1891). Chile.

Rhyssolepis australis (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera australis S. F. Blake, Contr. Gray Herb. n.s. 54: 148 (1918). Chile.

Rhyssolepis bakeriana (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera bakeriana S. F. Blake, Contr. Gray Herb. n.s. 54: 130 (1918). Brazil, Minas Gerais.

Rhysiolepis bishopii (H. Rob.) H. Rob. & A. J. Moore, comb. nov.

Viguiera bishopii H. Rob., *Phytologia* 45: 458 (1980). Bolivia.

Rhysiolepis bracteata (Gardn.) H. Rob. & A. J. Moore, comb. nov.

Viguiera bracteata Gardn., *London J. Bot.* 7: 404 (1848). Brazil. Distrito Federal, Goiás, Minas Gerais.

Rhysiolepis breviflosculosa (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera breviflosculosa S. F. Blake, *Contr. Gray Herb.* n.s. 54: 158 (1918). Uruguay.

Rhysiolepis brittonii (Hochr.) H. Rob. & A. J. Moore, comb. nov.

Viguiera brittonii Hochr., *Bull. New York Bot. Gard.* 6: 294 (1910). Peru.

Rhysiolepis discolor (Baker) H. Rob. & A. J. Moore, comb. nov.

Viguiera discolor Baker in Mart., *Fl. bras.* 6(3): 228 (1884). Brazil, Minas Gerais.

Rhysiolepis ellenbergii (Cuatrec.) H. Rob. & A. J. Moore, comb. nov.

Viguiera ellenbergii Cuatrec., *Proc. Biol. Soc. Wash.* 77: 146 (1964).

Peru. A second specimen from the type locality is as follows: Peru. Cuzco: Prov. Urubamba, ruinas de Machu Picchu, high above Río Urubamba, 80 km WNW of Cuzco, rock walls, rock piles, terraces & cliffs, Intyhuatana (Solar Observatory); 2500–2600 m, 27 May 1963, *Ugent 5376* (US).

Rhysiolepis fabrisii (Saenz) H. Rob. & A. J. Moore, comb. nov.

Viguiera fabrisii Saenz, *Darwiniana* 22: 50 (1979). Argentina.

Rhysiolepis fusiformis (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera fusiformis S. F. Blake, *Contr. Gray Herb.* n.s. 54: 145 (1918). Bolivia.

Rhysiolepis gardneri (Baker) H. Rob. & A. J. Moore, comb. nov.

Viguiera gardneri Baker in Mart., *Fl. bras.* 6(3): 224 (1884).

Originally described from Brazil, Goiás. Two more recent collections matching the type photograph are: Brazil. Goiás, Pirenópolis (Morro da Caixa D'água); cerrado seco, arborizado, com pedras no solo, sujeito ao fogo periódico; planta com 80 cm, ramificada inflorescência terminais, flores roxas, 23 Apr 1976, *Heringer 15560* (UB, US); Município de Niquelândia, entrada no km 8 da Rodovia Niquelândia/Uruaçu; Fazenda Traíras. Morro. Relêvo ondulado; 14°29'19"S, 48°33'19"W. Cerrado com muitas pedras de cor branca; arbusto, ca. 70 cm de altura; flores com corola amarela e anteras alaranjadas. Nome comum: margarida; 13 Apr 1996; *Mendonça, Marquete, Fonseca & Oliveira 2453* (UB, US).

Rhysiolepis gilliesii (Hook. & Arn.) H. Rob. & A. J. Moore, comb. nov.

Leighia gilliesii Hook. & Arn., *J. Bot. (Hooker)* 3: 313 (1841).

Helianthus heteropappus Gill. ex Hook. & Arn., *J. Bot. (Hooker)* 3: 314 (1841), nom. nud.

Viguiera gilliesii (Hook. & Arn.) Hieron., *Actas Acad. Nac. Ci. Córdoba* 4: 39 (1882).

Flourensia hispida Phil., *Anales Univ. Chile* 36: 186 (1870). Argentina, Chile.

Rhysiolepis grandiflora (Gardn.) H. Rob. & A. J. Moore, comb. nov.

Leighia grandiflora Gardn. in Field & Gardn., *Sert. Pl. t.* 54–55 (1844).

Viguiera grandiflora (Gardn.) Gardn., *London J. Bot.* 7: 404 (1848).

Rhysolepis guaranitica (Chod.) H. Rob.
& A. J. Moore, comb. nov.

Viguiera guaranitica Chod., Bull. Herb. Boiss. ser. 2, 3: 724 (1903). Argentina, Brazil, Paraguay.

Rhysolepis helianthoides (L. Rich.) A. J. Moore & H. Rob., comb. nov.
Fig. 1

Sanvitalia helianthoides L. Rich. in Willd., Sp. Pl. 3: 2190 (1803).

Helianthus procumbens Pers., Syn. Pl. (Persoon) 2: 475 (1807).

Viguiera pazensis Rusby, Mem. Torrey Bot. Club 3(3): 59 (1893).

Viguiera pflanzii Perkins, Bot. Jahrb. Syst. 49: 226 (1913).

Viguiera punensis S. F. Blake, Bot. Jahrb. Syst. 54, Beibl. 119: 48 (1916). Argentina, Bolivia, Peru.

The present complex was maintained as two separate species by Blake (1918) based on longer, relatively narrower leaf shape and more prominent leaf venation in *V. pazensis*. Separation was maintained by Saenz as recently as 1979 based on larger, ovate-lanceolate rather than ovate to oblong leaves, multiple rather than single heads per stem, and smaller involucre in *V. pazensis*. We could not separate the species using these characters, nor pubescence type or shape of the involucre bracts. Tips of the involucre bracts were sometimes reflexed and thus looked different from bracts without reflexed tips, but the lengths and shapes were the same.

The broadened concept of *Rhysolepis helianthoides* is characterized by leaves tuberculate-pilose adaxially, pilose abaxially with hairs denser on veins; stems ribbed and villous; and involucre bracts oblanceolate, subequal, often recurved, and with an indurate base and herbaceous apex. In addition, the achenes tend to have rather readily deciduous awns and squamellae, a character reportedly shared with *R. lanceolata* (Blake 1918).

The concept of *Viguiera pazensis* in this study includes two isotypes, *Bang 44* (US). Some more southern material might prove distinct, and the name *Helianthus atacamensis* Phil. (not *Viguiera atacamensis* Phil.) is for the present omitted from the synonymy. For an additional specimen that was determined as *V. pazensis*, but is not this species, see *Rhysolepis dillonorum* A. J. Moore & H. Rob. below.

Rhysolepis hilairei (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera hilairei S. F. Blake, Contr. Gray Herb. 54: 153 (1918). Brazil, Minas Gerais.

Rhysolepis hypoleuca (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera hypoleuca S. F. Blake, Contr. Gray Herb. n.s. 54: 165 (1918). Brazil, Matto Grosso.

Rhysolepis incana (Pers.) H. Rob. & A. J. Moore, comb. nov.

Helianthus incanus Pers., Syn. Pl. 2: 475 (1807).

Helianthus aureus Kunth in H.B.K., Nov. Gen. Sp., ed. fol. 4: 176 (1818).

Harpalum aureum (Kunth) Cass., Dict. Sci. Nat. 25: 438 (1822).

Viguiera chimboensis Hieron., Bot. Jahrb. Syst. 29: 38 (1900).

Viguiera lehmannii Hieron., Bot. Jahrb. Syst. 29: 38 (1900).

Viguiera aurea (Kunth) Hieron., Bot. Jahrb. Syst. 28: 608 (1901).

Viguiera incana (Pers.) S. F. Blake, Contr. U. S. Nat. Herb. 26: 252 (1930). Ecuador.

Rhysolepis kunthiana (Gardn.) H. Rob. & A. J. Moore, comb. nov.

Viguiera kunthiana Gardn., London J. Bot. 7: 399 (1848). Brazil, Goiás.



Fig. 1. *Rhysalepis helianthoides* (L. Rich.) A. J. Moore & H. Rob., A. Habit. B. Head with ray florets removed and involucre bracts not recurved. C. Head showing ray florets. D. Receptacular pale. E. Ray corolla showing lack of style. F. Disk floret showing striated achene with pappus of awns and squamellae. G. Disk corolla in section, showing filaments and anthers with small glands on outer surfaces of anther appendages. H. Disk style showing branches with continuous stigmatic area on inner surfaces and apex with hairs but no appendage. Drawn mostly from *Bang 44* (US, isotype of *Viguiera pazensis* Rusby); C. from *Buchtien 8579* (US).

Rhyssolepis lanceolata (Britton) H. Rob.
& A. J. Moore, comb. nov.

Viguiera lanceolata Britton, Bull. Torrey Bot. Club 19: 149 (1892).

V. mandonii Sch.Bip. ex Rusby, Mem. Torrey Bot. Club 3(3): 60 (1893).

Helianthus szyszlowiczii Hieron., Bot. Jahrb. Syst. 36: 491 (1905). Bolivia, Peru.

Rhyssolepis linearifolia (Chod.) H. Rob.
& A. J. Moore, comb. nov.

Viguiera linearifolia Chod., Bull. Herb. Boiss. ser. 2, 2: 392 (1902).

Viguiera trichophylla Dusén, Ark. Bot. 9(15): 30, f. 12 & t. 7. f. 4 (1910). Brazil, Goiás, Matto Grosso, Paraná; Paraguay.

Rhyssolepis linearis (Cav.) H. Rob. & A. J. Moore, comb. nov.

Helianthus linearis Cav., Icon., 3: 9, t. 218 (1794)[1795].

Helianthus squarrosus Kunth in H.B.K., Nov. Gen. & Sp., ed. fol. 4: 174, t. 377 (1818).

Leighia elegans Cass., Dict. Sci. Nat. 25: 435 (1822).

Leighia linearis (Cav.) DC., Prodr. 5: 581 (1836).

Viguiera linearis (Cav.) Sch.Bip. ex Hemsl., Biol. Centr.-Amer., Bot. 2:178 (1881). Mexico.

Rhyssolepis macbridei (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera macbridei S. F. Blake, J. Wash. Acad. Sci. 16: 218 (1926). Peru.

Rhyssolepis macrocalyx (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera macrocalyx S. F. Blake, Contr. Gray Herb. 54: 171 (1918). Brazil, Minas Gerais.

Rhyssolepis macropoda (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera macropoda S. F. Blake, Contr. Gray Herb. 54: 128 (1918). Brazil, Minas Gerais.

Rhyssolepis macrorhiza (Baker) H. Rob. & A. J. Moore, comb. nov.

Viguiera macrorhiza Baker in Mart., Fl. bras. 6(3): 225 (1884). Paraguay.

Rhyssolepis media (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera media S. F. Blake, Contr. Gray Herb. 54: 138 (1918). Ecuador.

Rhyssolepis mollis (Griseb.) H. Rob. & A. J. Moore, comb. nov.

Viguiera mollis Griseb., Abh. Königl. Ges. Wiss. Göttingen 19: 183 (1874).

Helianthus argentinus Saenz, Darwiniana 22: 64 (1979) Argentina.

We do not know why Saenz (1979) excluded the species from *Viguiera* in his treatment, creating the new name *Helianthus argentinus*. Panero (1992) was correct in returning the species to *Viguiera* as then delimited.

Rhyssolepis nervosa (Gardn.) H. Rob. & A. J. Moore, comb. nov.

Viguiera nervosa Gardn., London J. Bot. 7: 403 (1848). Brazil, Goiás.

Rhyssolepis nudibasilaris (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera nudibasilaris S. F. Blake, Contr. Gray Herb. 54: 149 (1918). Brazil, Minas Gerais.

Rhyssolepis nudicaulis (Baker) H. Rob. & A. J. Moore, comb. nov.

Viguiera nudicaulis Baker in Mart., Fl. bras. 6(3): 228 (1884). Uruguay.

Rhyssolepis oblongifolia (Gardn.) H. Rob.
& A. J. Moore, comb. nov.

Viguiera oblongifolia Gardn., London J.
Bot. 7: 402 (1848).

Rhyssolepis oblongifolia was described from Brazil, Goiás. Some more recent collections include: Brazil. Matto Grosso: Serra do Roncador, Mun. de Barra do Garças, 230 km along new road NNE of village of Xavantina, 6.0 km S of Córrego dos Porcos, 30 km due S of 12°51'S, 51°45'W. ca. 450 m, 26 Nov 1969, Eiten & Eiten 9547 (SP, US); 209 km NNE of Xavantina; 9 Dec 1969; Eiten & Eiten 9818 (SP, US); Minas Gerais. 56 km along road NE of Barroão, towards Porteirinha, 2400 ft.; 21 Jan 1981, King & Bishop 8585 (MO, US); Brasilândia de Minas, 1 Jun 2001, Soares 321 (BHCB, US); Maranhão, Balsas, approx. 25 km along road west from Balsas to fazenda of Sr. Damião; 7°40'S, 46°10'W; 4 Dec 1981; Jangoux et al. 1783 (US).

Rhyssolepis obtusifolia (Baker) H. Rob. &
A. J. Moore, comb. nov.

Viguiera obtusifolia Baker in Mart., Fl.
bras. 6(3): 226 (1884). Brazil, Goiás?

Rhyssolepis ovatifolia (DC.) H. Rob. & A.
J. Moore, comb. nov.

Leighia ovatifolia DC., Prodr. 5: 583
(1836).

Viguiera ovatifolia (DC.) Baker in Mart.,
Fl. bras. 6(3): 226 (1884).

The type is from Brazil, São Paulo. Additional specimens seen from Paraná match the type photograph: Jaguarihyva, ad marginem silvulae, 19 Apr 1910; Dusén 9723 (US)(det. Dusén as *Viguiera robusta*). Jaguarihyva opp., in campo, 740 m.s.m., 5 May 1914, G. Jönsson 262a (US)(det. Malme as *V. robusta*).

Rhyssolepis peruviana (A. Gray) H. Rob.
& A. J. Moore, comb. nov.

Viguiera peruviana A. Gray, Proc. Amer.
Acad. Arts 5: 124 (1861–62).

Viguiera weberbaueri S. F. Blake, Bot.
Jahrb. Syst. 54, Beibl. 119: 49 (1916).
Peru.

Rhyssolepis pilicaulis (S. F. Blake) H.
Rob. & A. J. Moore, comb. nov.

Viguiera pilicaulis S. F. Blake, Contr. Gray
Herb. 54: 164 (1918).

Rhyssolepis pilicaulis was described from Paraguay. A recent collection has been seen from Brazil: Matto Grosso do Sul. Rod. BR-267, próximo do km 447, descida da chapada (Mun. Guia Lopes de Laguna, 9 Mar 2003, G. & H. Hatschbach & Barbosa 74393 (MBM, US). The Brazilian specimen is most like the Field Museum type photograph of the now destroyed, broad-leaved Berlin specimen. The inflorescence is characteristically rather profusely branched with short peduncles, and there are only 8 or 9 short, slender rays while Blake cited 10 to 11. The species has antrorse prurorosity inside the disk corolla throat.

Rhyssolepis pilosa (Baker) H. Rob. & A.
J. Moore, comb. nov.

Viguiera pilosa Baker in Mart., Fl. bras.
6(3): 223 (1884).

Viguiera malmei S. F. Blake, Contr. Gray
Herb. 54: 151 (1918).

Viguiera misionensis Saenz, Darwiniana
22: 62 (1979).

Viguiera misionensis of northern Argentina shows no obvious differences from *R. pilosa* from southern Brazil in Paraná, Rio Grande do Sul, Santa Catarina.

Rhyssolepis pusilla (A. Gray) H. Rob. &
A. J. Moore, comb. nov.

Tithonia pusilla A. Gray, Proc. Amer. Acad.
Arts 5: 124 (1861–62).

Viguiera pusilla (A. Gray) S. F. Blake,
Contr. Gray Herb. 54: 160 (1918). Peru.

Rhyssolepis radula (Baker) H. Rob. & A. J. Moore, comb. nov.

Viguiera radula Baker in Mart., Fl. bras. 6(3): 223 (1884). Brazil, Minas Gerais.

Rhyssolepis retroflexa (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera retroflexa S. F. Blake, Contr. Gray Herb. 54: 146 (1918). Bolivia.

Rhyssolepis revoluta (Meyen) H. Rob. & A. J. Moore, comb. nov.

Helianthus revolutus Meyen, Reise Erde 1: 311 (1834).

Helianthus lanceolatus Meyen, Reise Erde 1: 311 (1834), not *V. lanceolata* Britton
Flourensia corymbosa DC., Prodr. 5: 592 (1836).

Viguiera poeppigii A. Gray, Proc. Amer. Acad. Arts 19: 6 (1883).

Viguiera corymbosa (DC.) S. F. Blake, Proc. Amer. Acad. Arts 49: 349 (1913).

Viguiera revoluta (Meyen) S. F. Blake, Contr. Gray Herb. 54: 121 (1918). Argentina, Chile.

Rhyssolepis robusta (Gardn.) H. Rob. & A. J. Moore, comb. nov.

Viguiera robusta Gardn., London J. Bot. 7: 403 (1848). Brazil, Goiás.

Rhyssolepis rojasii (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera rojasii S. F. Blake, Contr. Gray Herb. 54: 179 (1918). Paraguay.

Rhyssolepis salicifolia (Hassl.) H. Rob. & A. J. Moore, comb. nov.

Viguiera salicifolia Hassl., Repert. Spec. Nov. Regni Veg. 14: 274 (1916).

Viguiera villaricensis S. F. Blake, Contr. Gray Herb. 54: 152 (1918). Argentina, Paraguay.

Rhyssolepis simsioides (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera simsioides S. F. Blake, Bot. Jahrb. Syst. 54. Beibl. 119: 48 (1916). Peru.

Rhyssolepis sodiroi (Hieron.) H. Rob. & A. J. Moore, comb. nov.

Helianthus sodiroi Hieron., Bot. Jahrb. Syst. 29: 41 (1900).

Viguiera sodiroi (Hieron.) S. F. Blake, Contr. Gray Herb. 54: 139 (1918). Ecuador.

Rhyssolepis speciosa (Hassl.) H. Rob. & A. J. Moore, comb. nov.

Viguiera speciosa Hassl., Repert. Spec. Nov. Regni Veg. 14: 272 (1916).

Viguiera simulans S. F. Blake, Contr. Gray Herb. 54: 127 (1918).

Rhyssolepis speciosa has been known from Paraguay; Brazil, Matto Grosso. It also occurs in the Distrito Federal with specimens previously identified as *Viguiera squalida* as follows: Peunsula Norte, 1000 m, s. d., Valério de Carvalho dos grupos 11 (UB, US); Reserva Ecológica do IBGE, 7 Nov 1977, *Heringer et al.* 249 (IBGE, US); Area do Cristo Redentor: 15°57'07"S, 47°53'37"W, 19 Oct 1988, *Azevedo 180* (IBGE, US); Reserva Ecológica do IBGE, Campo Limpo; 21 Aug 1990, *Silva et al. 1009* (IBGE, US); Cristo Redentor, 10 Oct 1990, *Brochado 70* (IBGE, US); Tampão das parcelas de campo sujo do Projeto Fogo—IBGE, 9 Dec 1991, *Landim de Souza 83* (IBGE, US); Ecológica do IBGE, 15°56'41"S, 47°53'07"W, 7 Nov 1994, *Aparecida da Silva 2457* (IBGE, US).

Rhyssolepis squalida (S. Moore) H. Rob. & A. J. Moore, comb. nov.

Viguiera squalida S. Moore, J. Bot. 42: 37 (1904). Brazil, Goiás, Matto Grosso, Matto Grosso do Sul.

Rhysolepis subdentata (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera subdentata S. F. Blake, Contr. Gray Herb. 54: 131 (1918). Brazil, Minas Gerais.

Rhysolepis tenuifolia (Gardn.) H. Rob. & A. J. Moore, comb. nov.

Viguiera tenuifolia Gardn., London J. Bot. 7: 400 (1848). Brazil, Minas Gerais.

Rhysolepis tuberculata (S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera tuberculata S. F. Blake, Contr. Gray Herb. 54: 151 (1918). Brazil, Minas Gerais.

Rhysolepis tuberosa (Griseb.) H. Rob. & A. J. Moore, comb. nov.

Viguiera tuberosa Griseb., Abh. Königl. Ges. Wiss. Göttingen 24: 192 (1879). Argentina; Brazil, Rio Grande do Sul, Uruguay.

Rhysolepis tucumanensis (Hook. & Arn.) H. Rob. & A. J. Moore, comb. nov.

Leighia tucumanensis Hook. & Arn., J. Bot. (Hooker) 3: 314 (1841)

Viguiera stenophylla (Hook. & Arn.) Griseb. var. *discoidea* Griseb., Abh. Königl. Ges. Wiss. Göttingen 24: 193 (1879).

Viguiera discoidea (Griseb.) S. F. Blake, Contr. Gray Herb. 54: 157 (1918).

Viguiera oligodonta S. F. Blake, Contr. Gray Herb. 54: 146 (1918). Argentina.

Rhysolepis weddellii (Sch.Bip. ex S. F. Blake) H. Rob. & A. J. Moore, comb. nov.

Viguiera weddellii Sch.Bip. ex S. F. Blake, Contr. Gray Herb. 54: 126 (1918). Bolivia; Brazil, Goiás-Matto Grosso.

In addition to the species listed above we include the following seven previously un-

described species. Of the new species, the ones from Bolivia and Santa Catarina, Brazil, seem to fit Blake's series *Aureae*; whereas the others fit his series *Bracteatae*. One character seen in the new species seems to partially reinforce the distinction. All of the new members of the *Bracteatae* except *R. subtruncata* have bands of prorulose cells on the inner surface of the disk corolla throats, midway between the veins and often also along the veins. Prorulosity is the condition where elongate cells have the upper ends projecting as papillae. The two new species in the *Aureae* lack such prorulose bands. The specimens were described partially from dissections of florets mounted in Hoyer's solution (Anderson 1954).

Rhysolepis dillonorum A. J. Moore & H. Rob., sp. nov.
Fig. 2

Type: Peru. Arequipa: Prov. Caraveli, Lomas of Atiquipa, ca. 10.5 km N of turn-off to Atiquipa, 584 km S of Lima; ca. 150–200 m, 1 Nov 1983, *M. O. Dillon* & *D. Dillon* 3775 (holotype US; isotype F).

E speciebus omniibus in habitis fruticosis et in indumento appresse strigulosus et in bracteis involucris plerumque obtusis distincta.

Shrub to 1 m high, moderately and alternately branched at 30–45° angles; roots not seen; stem tan to dark brown, closely appressed-strigulose, glabrescent with age. Leaves usually opposite in middle of branches, alternate at base of branches and distally, not decrescent except near heads; petioles none to 0.2 cm long, bases sometimes continuous across node; blades ovate to oblong-ovate, 1.5–4.2 cm long, 0.7–2.2 cm wide, base broadly acute to rounded, margins entire, apex acute, both surfaces densely appressed-strigulose, abaxially with scattered glandular dots, triplinervate from near base, secondary veins reaching distal ½. Heads borne singly on long branches or with 2 or 3 heads on short branches; brac-

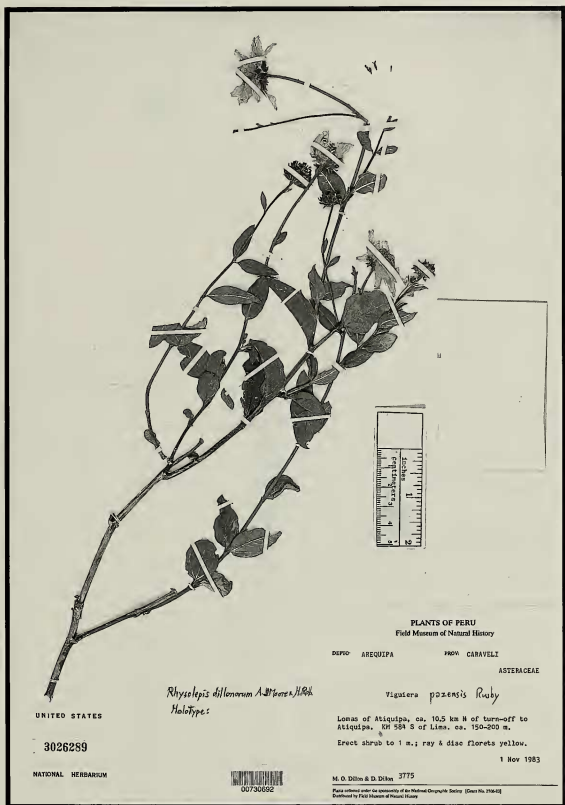


Fig. 2. *Rhysalepis dillonorum* A. J. Moore & H. Rob., holotype, Dillon & Dillon 3775 (US).

teoles decrescent, oblong, 1.1–0.4 cm long; peduncles 3.5–17 cm long, 0.5–5.0 cm from last bracteole, appressed-strigulose. Involucre 0.4–0.6 cm high, 1.2–1.5 cm diam.; bracts 2–3-seriate, obovate, gradate, 4–8 mm long, 2–4 mm wide, 3–5-nerved, tips obtuse to short-acuminate, indurate in proximal $\frac{1}{2}$ to $\frac{3}{4}$, distally herbaceous, abaxially and adaxially appressed-strigulose especially on tips; paleae obovate, indurate, ca. 7.5 mm long, ca. 1.0–1.5 mm wide, scabridulous on tip, apex short-acute. Ray florets 13–14; corollas yellow, tube ca. 1.2 mm long, sparsely scabridulous; limb oblong-elliptical, 1.5 cm long, 0.5–0.8 cm wide, sparsely scabridulous abaxially, apex 3-lobed. Disk florets at least 50; corolla yellow, ca. 5 mm long, tube 1 mm long, scabridulous; throat 3 mm long, slightly campanulate at base, scabridulous proximally, glabrous distally, with vertical bands of antrorsely prurulose cells inside, lobes 1 mm long, glabrous outside, papillose inside especially near margins; anther thecae 2 mm long; appendages yellow, 0.6–0.75 mm long, ca. 0.45 mm wide. Ray achenes ca. 3.5 mm long, ca. 0.7 mm wide, sericeous on margins, with pappus crown ca. 0.1 mm high. Disk achenes 3.5 mm long, 0.9 mm wide, sericeous with setulae over whole surface; pappus awns 2.0–2.2 mm long, fimbriate-margined, squamellae ca. 4, 1.0–1.2 mm long, ca. 1 mm wide, margins fimbriate. Pollen 30–33 μ m in diam. in Hoyer's solution.

Rhysolepis dillonorum is presently known only from the type collection. The specimen was earlier identified as *Viguiera pazensis*; it was seen as distinct in a recent review of the latter by the senior author of the new species. The low elevation at 150–200 m near the coast, the shrubby habit, the appressed minute hairs on the stems, leaves, and involucre bracts, and the blunt tips of the involucre bracts are all distinctive. The supposed Andean relatives are found at 2000 m or above, are more herbaceous, have longer, mostly spreading hairs, and

have more lanceolate, subequal involucre bracts.

The blunt involucre bracts and the vertical bands of prurulose cells inside the disk corolla throat seem to relate the new species to members of Blake's section *Bracteatae* that are most common in Brazil and distinguish the species from the section *Aureae* to which *V. pazensis* (= *R. helianthoides*) belongs. Opposite leaves are common on the specimen, but the branching is alternate, and the basal nodes of the branches have alternate leaves.

Rhysolepis emaciata H. Rob. & A. J.

Moore, sp. nov.

Fig. 3

Type: Bolivia. Cochabamba: 10 NE; 2465 m; Campero, pajonal de *Elyonurus tripsacoides*, 2 May 1999, Antezana 1276 (holotype US, isotype MO).

E speciebus aliis boliviensis in seriebus *Aureis* in ramis nullis in foliis dense spiralter insertis et in bracteis involucri ca. triseriatis gradatis differt.

Slender subshrub or shrub 0.4–0.6 m tall, apparently unbranched above base; roots not seen; stems reddish-brown, densely hispid with long hairs. Leaves rather densely spirally inserted, sessile; laminae herbaceous, lanceolate, 1.5–2.8 cm long, 0.5–0.8 cm wide, base rounded, margins often with single blunt tooth near basal $\frac{1}{4}$, subtire to remotely undulate distally, apex acute, mucronulate, adaxial surface densely scabrous with slender hairs, abaxially densely villous with white hairs and densely gland-dotted; triplinerved from near base, reaching to $\frac{1}{2}$ leaf length. Inflorescence example seen with single terminal head, with leaves on 7 cm below head becoming smaller, uppermost bractlike; peduncle 2.5 cm long from last foliiform bract, densely villous. Head with involucre 1 cm high, 2 cm wide; bracts ca. 3-seriate, oblong-lanceolate, gradate, 6–10 mm long, 1.5–2.0 mm wide, appearing herbaceous throughout, villous with white hairs abaxially, without distinct cilia on



Fig. 3. *Rhysalepis emaciata* H. Rob. & A. J. Moore, holotype, Antezana 1276 (US).

margins distally, tips acute to slightly mucronulate, erect on inner bracts, shortly recurved on other bracts, scabridulous on both surfaces; paleae yellowish-tan, indurate, oblong, 7.5 mm long, ca. 2.5 mm wide, tip minutely hispidulous, acute to, sometimes, trifid. Ray florets 17–18; corollas yellow, tube 1.5 mm long, hispidulous, limb oblong, ca. 1.0–1.1 cm long, 0.4 cm wide, abaxial surface strigose and gland-dotted, apex 2- or 3-lobed. Disk florets 50 or more; corollas darker yellow, ca. 6 mm long, tube ca. 1 mm long, scabridulous, throat ca. 4 mm long, campanulate and scabridulous at base, smooth inside, lobes 1.0–1.2 mm long, strigulose outside, papillose inside; anther thecae 2.5–3.0 mm long, with slender basal hastation much longer than collar, essentially short-tailed; appendage 0.58–0.70 mm long, 0.35–0.41 mm wide. Achenes ca. 2.5–3.0 mm long, 0.8 mm wide, sparsely strigulose with stiff setulae; pappus color a very light tan, awns 3.0–3.5 mm long, with fimbriate margins, squamellae ca. 5, 1.0–1.5 mm long, 0.2–0.5 mm wide, deeply fimbriate. Pollen grains 25–28 μ m in diam. in Hoyer's solution.

Rhysolepis emaciata is known only from the type collection. Relation might be expected to *R. australis*, *R. fusiformis*, *R. helianthoides*, and *R. lanceolata* of the Bolivian Andes, but the latter all have thicker stems, more obvious branching, and only about 2 series of subequal involucre bracts. The spirally inserted leaves of *R. emaciata* characteristically seem to contract slightly in width near the basal fourth. The bases of the anthers seem unusually long and tailed for a member of the Heliantheae.

Rhysolepis goyasensis H. Rob. & A. J. Moore, sp. nov.
Fig. 4

Type: Brazil. Goiás: Serra Geral do Paraná, ca. 3 km S of São João da Aliança, near Riacho, ca. 850 m, gallery forest and adjacent cerrado, 15 Mar 1971, *Irwin, Har-*

ley & G. L. Smith 31821 (holotype US; isotypes NY, UB, US).

A *R. breviflosculosam* in pubescentibus caulis et involucri similis sed in foliis superioribus decrescentibus et in laminis base non cordatis differt.

Subshrub to 1 m high; usually unbranched between base and inflorescence; part of rhizome seen, roots moderately stout, spreading, without evident fusiform enlargements; stem reddish-brown to tan, pilose to lanulose, denser above, hairs spreading to retrorse. Leaves alternate, reduced to bracteoles distally, often gradually decrescent; petioles ca. 2 mm long; blades oblong-elliptical, 0.6–6.5 cm long, 0.3–2.1 cm wide, at base broadly acute, margins entire, apex short-acute to short-acuminate, adaxially villous with tubercle-based hairs, abaxially villous, triplinervate from near base, secondary veins reaching distal $\frac{1}{2}$ of blade. Inflorescences unbranched or with 1–3 branches on each side, conic to cylindrical when multibranched, elongate branches shorter than main axis, spreading at ca. 45° angles; bracteoles narrowly oblong-elliptical 0.7–3.0 mm long; peduncles 3.5–5.0 cm long, 1–2 mm long from last bracteoles, lanulose as in stems. Heads usually 1–5; involucre 0.9–1.1 cm high, 1.2–1.9 cm wide; bracts ca. 3-seriate, oblong to oblong-lanceolate, gradate, 10–15 mm long, 3–4 mm wide, 3-nerved, tips abruptly acute to slightly acuminate, slightly indurate at base or herbaceous throughout; paleae rather oblong, coriaceous, ca. 8 mm long, ca. 2 mm wide, apex short-acute to mucronulate. Ray florets 14–15; corollas yellow; tube 3.5 mm long, pilosulous; limb 1.5 cm long, 0.4 cm wide, pilosulous abaxially on veins, apex 2 or 3 lobed. Disk florets ca. 50; corolla yellow, ca. 5 mm long, tube 0.7–1.0 mm long, nearly glabrous; throat 2.5–3.0 mm long, slightly campanulate at base, glabrous, inside with vertical bands of antrorsely prurulose cells, lobes 0.7–1.0 mm long, acute, sparsely scabrid outside, papillose inside; anther thecae 2.5 mm long, appendages yellow, 0.55–0.60 mm long, 0.3–0.4 mm wide.



Fig. 4. *Rhysoplepis goyasensis* H. Rob. & A. J. Moore, holotype, Irwin, Harley & Smith 31821 (US).

Achenes 3 mm long, 0.8–1.0 mm wide, glabrous except few, small, marginal setulae; pappus awns 2.0–3.1 mm long, minutely scabrid on margins and keel, squamellae ca. 8, 1.1–1.7 mm long, 0.3–0.5 mm wide, margins fimbriate. Pollen 27–30 μm in diam. in Hoyer's solution.

Paratypes: Brazil. Goiás: São João de Aliança, estrada para Vãozinho, campo cerrado, solo rochoso, 9 Feb 1994, *G. & M. Hatschbach* 60230 & *Silva* (MBM, US); Corrente (Mun. São João da Aliança), campo cerrado, solo rochoso, 20 Feb 2000, *G. & M. Hatschbach* & *O. S. Ribas* 70471 (MBM, US).

Rhysolepis goyasensis has pubescence of the stems and involucre reminiscent of that in *R. breviflosculosa* far to the south in Uruguay. The new species differs by the leaf blades lacking cordate subamplexicaul bases and by the decrescent size of the distal leaves of the stem. The new species seems related to the *R. robusta* species group, but has few or single heads or a narrowly conic to cylindrical inflorescence borne well beyond the larger stem leaves.

Rhysolepis hatschbachii H. Rob. & A. J. Moore, sp. nov.

Fig. 5

Type: Brazil. Matto Grosso do Sul: Rodovia Bonito, Campo dos Índios, próximo de Três Morros (Mun. Bonito); encosta do morro; solo calcário, 10 Mar 2003, *G. & M. Hatschbach* & *E. Barbosa* 74469 (holotype MBM, isotype US).

A *R. gardneri* in formibus capituli similis sed in foliis abaxialiter dense pilosulis et in pedunculis ebracteatis longioribus et in limbis radii abaxialiter glabris distincta.

Perennial herb or subshrub to 1 m high, with lateral branches ascending at 35–40° angles; roots not seen; stems tan to dark brown, densely hispid to strigose. Leaves of main stems alternate, 4.5–8.5(11) cm long, 1.5–2.8(4.2) cm wide, on branches often opposite, 2.0–5.5 cm long, 0.5–1.5 cm wide; petioles 1–2 mm long; laminae her-

baceous, oblong-elliptical, base obtuse, margins entire to remotely serrulate, apex short-acute and apiculate, adaxial surface densely pilosulous with bases of hairs often enlarged, abaxial surface densely scabridulous on veins, less densely pilosulous between veins, gland-dotted; triplinervate with strongly ascending secondary veins reaching middle or distal $\frac{1}{3}$ of blade. Inflorescence of few heads terminal on stems and branches; peduncles 9–30 cm long without leaves or bracts, strigulose to hispid with white hairs, hairs denser below heads; involucre 10–13 mm high, 13–20 mm wide; bracts broadly 3–4-seriate, slightly unequal, oblong with obtuse to acute tips, 7–11 mm long, ca. 4 mm wide, bases of inner bracts indurate and strongly ribbed, abruptly shortly herbaceous and sometimes recurved at tips, outer bracts canescent with white, densely strigulose pubescence, margins densely fimbriate with short cilia, inner surface usually glabrous, rarely strigulose near tip; paleae oblanceolate, ca. 9 mm long, 1.5 mm wide, acute, essentially glabrous. Ray florets 9–14; corollas yellow, tube ca. 1 mm long, sparsely pilosulous; limb narrowly elliptical, ca. 1.7–2.4 cm long, 0.5–0.6 cm wide, abaxially glabrous, apex minutely bilobed. Disk florets 35–45 or more; corollas yellow, ca. 5 mm long, tube ca. 1 mm long, scabridulous, throat ca. 3 mm long, sparsely scabridulous on narrowly campanulate base, with vertical bands of antrorsely prurulose cells inside, lobes ca. 1 mm long, nearly glabrous abaxially, papillose inside; anther thecae ca. 2.3 mm long; appendage yellow, 0.6–0.7 mm long, ca. 0.4 mm wide. Sterile ray ovaries with pair of squamellae 0.5–0.9 mm long; disk achenes ca. 4 mm long, ca. 1.2 mm wide; awns 3.0–3.5 mm long, squamellae narrow, 0.5–0.8 mm long, fimbriate. Pollen grains ca. 32 μm in diam. in Hoyer's solution.

Paratype: Brazil. Matto Grosso do Sul: Serra de Bodoquena, Fazenda Bodoquena, Reserva da Tercola (Mun. Miranda); Mata, 5–8 m, Sopé de morro, solo argiloso raso,



Fig. 5. *Rhysiolepis hatschbachii* H. Rob. & A. J. Moore, isotype, G. & M. Hatschbach & Barbosa 74469 (US).

encharcado, 17 Mar 1995, A. Pott & *al.* 7026 (US, MBM).

Rhysolepis hatschbachii is known from only the two cited collections. The paratype was previously determined as near *R. gardneri* of Goiás, and the latter is possibly the closest relative. Differences include the long peduncles of the latter having many foliiform bracts, its involucre bracts being distinctly narrower and pale at the base, and its rays being shorter and puberulous abaxially. The general habit of the new species is closer to *R. ovatifolia* of São Paulo and Paraná, but that species has distinctive narrower involucre bracts that are essentially glabrous except for the densely ciliate margins.

Rhysolepis laxicymosa H. Rob. & A. J.

Moore, sp. nov.

Fig. 6

Type: Brazil. Minas Gerais: Serra do Cabral, estrada para Francisco Dumont (Mun. Joaquim Felício); campo rupestre, 950 m, 16 May 2001, G. & M. Hatschbach & Barbosa 72088 (holotype MBM, isotype US).

A speciebus novis *R. goyasensem* similis sed in caulibus non lanulatis et in inflorescentiis laxe cymiformibus et in limbis radii brevibus distinctis.

Erect perennial herb or subshrub 50–90 cm high, apparently unbranched between base and inflorescence; roots not seen; stem reddish-tan, pilose to strigose or thinly villous. Leaves alternate; petioles ca. 1 mm long; laminae coriaceous, oblong-elliptical, 3.7–1.5 cm long, 1.6–0.6 cm wide, decrescent toward inflorescence, base rounded to broadly acute, margins entire or remotely 1–3-subserulate, apex short-acute and slightly mucronulate, adaxial surface sparsely strigose and densely scabridulous, abaxial surface with prominent veins and prominent veinlets, densely strigose on veins, strigulous to subsericeous between veins, gland-dotted; triplinerved from near base, secondary veins reaching distal 1/3 or

more of blade. Inflorescences are sparingly branched, cymiform, branches long, ascending at ca. 30° angles; with bracteoles mostly at branch bases 1.5–0.7 cm long, 0.6–0.3 cm wide; peduncles 6–23 cm long, strigose, more densely villous near heads, with bracteoles 7–3 mm long, 3–1 mm wide. Heads ca. 5; involucre 0.5–0.6 cm high, 1.0–1.2 cm wide; bracts ca. 3-seriate, oblong, somewhat gradate, 3.0–6.5 mm long, 0.8–1.2 mm wide, tips obtuse to short-acute, outer bracts indurate in basal 1/2, herbaceous in distal 1/2, inner bracts almost completely indurate with broad sclerified bands between veins, exposed surfaces densely pilosulous; paleae pale tan, papery, lanceolate to oblong, ca. 7 mm long, ca. 1.5 mm wide, scaberulous at base and tip, gland-dotted at tip. Ray florets ca. 18; corollas yellow, tube ca. 1.2 mm long, scabridulous; limb broadly oblong, 6.5 mm long, 1.8–3.0 mm wide, puberulous abaxially on veins, apex trilobed. Disk florets 30–35 or more; corollas yellow, 4 mm long, basal tube 1 mm long, scabridulous, throat ca. 2.5 mm long, base slightly campanulate and scabridulous, with vertical bands of antrorsely prorate cells inside, especially midway between veins, lobes ca. 0.7 mm long, pilosulous distally outside, papillose inside; anther thecae ca. 1.8 mm long; appendages yellow, 0.4–0.5 mm long, 0.33–0.38 mm wide. Achenes ca. 3.5 mm long, ca. 1.1 mm wide, sericeous with slender setulae; pappus whitish, awns mostly 2.0–2.5 mm long, fimbriate on margins and midrib; squamellae 5 or 6, ca. 1 mm long, 0.2–0.5 mm wide, margins fimbriate. Pollen grains 22–28 µm in diam. in Hoyer's solution.

Rhysolepis laxicymosa seems mostly closely related to *R. goyasensis*, but it is smaller in all parts. The pubescence of the stem is shorter, the inflorescence is more slender with fewer bracts, the involucre is smaller with narrowly oblong bracts, and the rays are scarcely twice as long as the involucre. In the length of its rays, *R. laxicymosa* is closer to *R. subtruncata*, also of Goiás, which has distinctive subtruncate

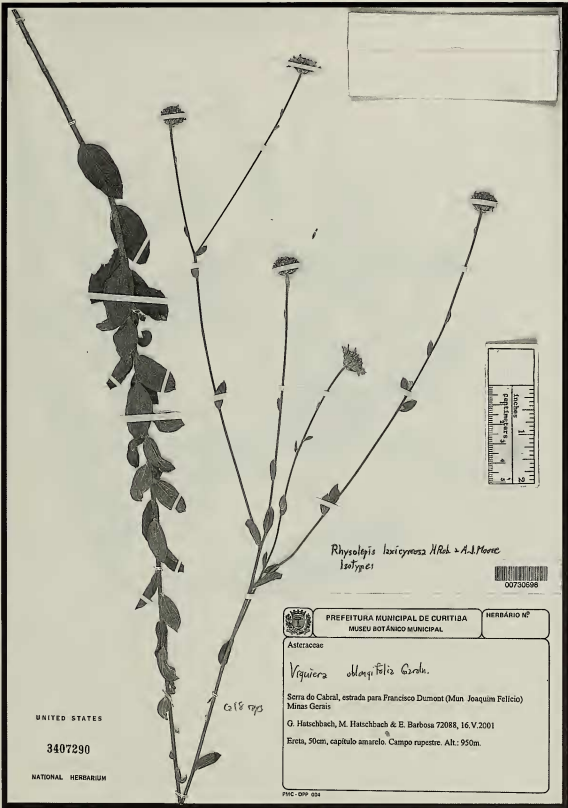


Fig. 6. *Rhysalepis laxicymosa* H. Rob. & A. J. Moore, isotype, G. & M. Hatschbach & Barbosa 72088 (US).

leaves that are not decrescent below the inflorescence.

Rhysolepis santacatarinensis H. Rob. &

A. J. Moore, sp. nov.

Fig. 7

Type: Brazil. Santa Catarina: Serra do Faxinal (Mun. Praia Grande), paredões rochosos, 1200 m, 15 Apr 1993, G. & M. Hatschbach 59135 & J. M. Silva (holotype MBM, 2 isotypes US).

A *R. pilosam* in foliis lanceolatis et bracteis involucris lanceolatis similis sed in foliis distincte petiolatis et in nervis pinnatis et in caulibus densius lanulatis differt.

Subshrub or shrub to 1 m high, moderately branched; roots not seen; stems tan to reddish-brown, villous, hairs denser near heads. Leaves alternate; petioles 0.2–1.7 cm long, sometimes slightly winged, villous; laminae herbaceous, lanceolate, 4–17 cm long, 0.4–3.5 cm wide, base and apex attenuate to acuminate, margins remotely crenate-serrulate, adaxially tuberculate-scabrous, abaxially densely canescent, pilose to subvillous, denser on veins, with glandular dots; venation pinnate or essentially pinnate. Inflorescence with 1 or 2 heads per branch, often overtopped by leaves; peduncles 0.2–2.0 cm long. Heads 4–8; involucre 0.75–1.25 cm high, 2–3 cm wide, 3.5 cm wide in fruit; bracts 2–3-seriate, narrowly lanceolate to narrowly oblanceolate, 12–22 mm long, 2–3 mm wide, apices acuminate to mucronulate, tips strongly recurved, basal $\frac{1}{4}$ to $\frac{1}{2}$ indurate, 5-ribbed, distally herbaceous, abaxially villosulous, adaxially at tip pilosulous to subglabrous, sparsely gland-dotted, margins finely ciliate; paleae oblong, ca. 9–11 mm long, ca. 2 mm wide, indurate, to 7-ribbed, apex acute and mucronulate, sometimes with teeth, glabrous with scabridulous midvein. Ray florets ca. 23; corollas yellow, tube ca. 1 mm long, sparsely puberulous; limbs narrowly elliptical, 1.5–3.5 cm long, 0.3–0.4 cm wide, apex 1- or 2 -(3-) lobed, abaxially puberulous, gland-dotted. Disk florets to 120 or

more; corollas yellow, 5–6 mm long, tube 1.5 mm long, glabrous, throat 3.5 mm long, base moderately campanulate, scabridulous on base and veins, smooth inside, lobes 0.5–1.0 mm long, acute, sometimes sparsely scabridulous outside, papillose on distal $\frac{1}{2}$ inside; anther thecae 2.5–3.0 mm long; appendage yellow, 0.7–0.8 mm long, 0.3–0.4 mm wide. Achenes 4 mm long, ca. 1 mm wide, glabrous except for marginal setulae near pappus; awns 2–3 mm long, squamellae separated into broad segments, ca. 0.5 mm long, fimbriate. Pollen 25–28 μ m in diam. in Hoyer's solution.

Paratypes: Brazil. Santa Catarina: Mun. Lauro Müller; 20 km west of Lauro Müller, lower and middle slopes of serra by Rio do Rastro, 700–1000 m, 3 Apr 1957, L. B. Smith & R. Klein 12339 (FLOR, US); Rod. SC-438, Serra do Rio do Rastro (Mun. Lauro Müller); Paredões rochosos; 1000 m, 7 Apr 1991, G. & M. Hatschbach & E. Barbosa 55311 (MBM, US).

Rhysolepis santacatarinensis would belong to the series *Aureae* of Blake (1918) on the basis of its lanceolate involucre bracts, and it would key to various species in the Blake key depending on the emphasis given to the dense canescent pubescence of the abaxial faces of its leaves. Its distribution in southern Brazil and shape of its leaves suggest closest relation to *R. pilosa*, which has much sparser pilose pubescence, usually no petiole, and much smaller heads. The large heads with 120 or more disk florets distinguish the new species from most other members of the genus in Brazil and elsewhere. The venation of the leaves is also distinctive, lacking strongly ascending lateral veins at the base. The basal secondary veins are either strictly pinnate or only slightly more ascending.

Rhysolepis subtruncata H. Rob. & A. J.

Moore, sp. nov.

Fig. 8

Type: Brazil. Goiás: Chapada dos Veadeiros, ca. 42 km N of Alto do Paraíso, ca.

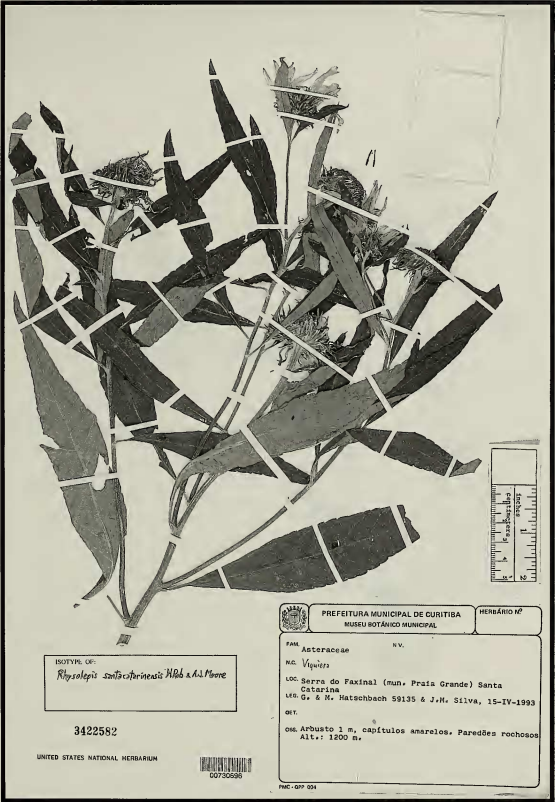


Fig. 7. *Rhysolepis santacatarinensis* H. Rob. & A. J. Moore, isotype, G. & M. Hatschbach 59135 & Silva (US).



Fig. 8. *Rhysalepis subtruncata* H. Rob. & A. J. Moore, holotype, Irwin, Harley & Smith 33151A (US).

125 m elev., riacho margin in cerrado, on rocky slopes and adjacent campo, 25 Mar 1971, *Irwin, Harley & G. L. Smith 33151A* (holotype US, isotypes NY, UB).

E speciebus aliis in foliis coriaceis saepe subtruncatis et in ramis inflorescentibus longis valde ascendentibus et in floribus radiis brevibus differt.

Subshrub to 2.5 m high, with few or no branches between base and inflorescence; roots not seen; stems tan to reddish-brown, strigose to stiffly pilose. Leaves alternate, petioles 0–1 mm long, 1–2 mm broad, densely villosulous abaxially; laminae coriaceous, obovate to cuneate, 1.8–4.5 cm long, 0.8–2.4 cm wide, scarcely smaller but more remote up to inflorescence, base cuneate, margins slightly crenulate-serrulate above, apex subtruncate to scarcely retuse, adaxial surface nearly smooth, hairs strigose with enlarged bases, abaxial surface with prominulous veinlets, pilose to thinly sericeous, triplinervate from near base, lateral veins reaching distal $\frac{1}{4}$. Inflorescence loosely corymbiform, with 2 or 3 long branches on each side, ascending at ca. 30° angles, pilose; bracts foliiform, mostly $\frac{1}{2}$ to $\frac{1}{2}$ as large as leaves, mostly at bases of branches, with few bracteoles on distal branches; peduncles 0.4–2.0 cm long beyond bracteoles. Heads ca. 9; involucre 0.8 cm high, ca. 1.5 mm wide; bracts ca. 2-seriate, lanceolate, 5–8 mm long, 1–2 mm wide, acute to slightly acuminate, basal $\frac{1}{4}$ to $\frac{3}{4}$ indurate, apices herbaceous, appressed to slightly spreading, abaxially puberulous, adaxially at tip pilosulous; paleae rather oblong, obtuse, ca. 5.5 mm long, ca. 1.5 mm wide, indurate, glabrous or with midvein strigulose. Ray florets ca. 20; corollas yellow, tube ca. 1.2 mm long, pilosulous; limb broadly oblong, 5–6 mm long, 3.5–4.0 mm wide, apex unlobed or 2-lobed, abaxially pilosulous mostly on veins, Disk florets ca. 50?; corollas yellow-brown, 4 mm long; tube 0.8 mm long, sparsely scabrid, throat 2.5 mm long, base scabrid, narrowly campanulate, glabrous distally, smooth inside, lobes deltate, ca. 1 mm long, scabrid out-

side; anther thecae 1.8–2.0 mm long; appendage yellow, 0.35–0.40 mm long, 0.45–0.55 mm wide. Achenes (immature) 2.5 mm long, 0.8–1.0 mm wide, setulae over whole surface, sericeous; pappus awns ca. 1.5 mm long, squamellae ca. 0.5 mm long, deeply fimbriate. Pollen grains 22–26 μ m in diam. in Hoyer's solution.

Rhysolepis subtruncata has distinctive cuneate, coriaceous leaves and ascending branches of the inflorescence reaching the level of the terminal central head. The rays are very short compared to many other species of the genus. The leaves below the inflorescence are not or are scarcely decrescent. The throats of the disk corollas lack the vertical bands of prorulose cells found in other species of sect. *Bracteatae*. Any additional collections should be readily identifiable by the leaf shape and by the overall habit of the leafy plants and inflorescence.

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